The affects of health shocks and house prices on debt holdings by older Americans

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The Effects of Health and House Price Shocks on Debt holdings by Older American Households

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Related Literature

Asset portfolios of the elderly:

Venti & Wise (1989, 1990, 2004); Shiener & Weil (1993); Hurd (1999); Coile & Mulligan (2006); Yogo (2008)

Debt holdings of the elderly: Lee et al (2007)

Saving by the very old: Di Nardi et al (2009)

Theoretical Considerations

Assume PIH,

$$u'(c_t) = E_t\left(\frac{(u'(c_{t+1}))(1+r_{t+1})}{(1+\rho_{t+1})}\right),$$

If

$$\rho = r$$

$$s_t = -\sum_{j=1}^{\infty}(1+r)^{-j}E_t\Delta y_{t+j}$$

Borrowing occurs when .

$$s_t < 0$$

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Implications

- Those predicting income to drop on retirement will prefer to save rather than hold debt.
- As individual comes closer to expected life end, discount rate rises, consumption increases and so does deb.
- If hyperbolic discounting the debt holding even higher.
- Model assumes zero bequests. If positive bequests then will consume so expected net assets equal desired bequest.
- Consumption, so debt, is a function of taste shifters.
-

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Health Shocks

If retired and has health ins – demand for debt may be unaltered

If working and

- has health ins - Yp may fall and if cannot reduce consumption- short term debt increases
- has no health ins – Yp may fall and even more short term debt is taken on

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Medicare

Available to eligible Americans aged >=65

Will pay for up to 4 types of benefits:

- Hospitalisation (Part A) – free (apart from $1068 deductible) for up to 60 days if paid 40 consecutive months of FIC Act taxes. (otherwise pay up to $423/m premium)
- Outpatient care (Part B) – need to pay up to $96.40/month as premium
- Contribution to outpatient and hospitalisation care (Part C) (rest paid for by private health care plan)
- Prescription charges (Part D)

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Widowhood

If partner dies remaining partner may reduce mortgage debts by using life insurance payouts or by downsizing family home

Venti & Wise (1989, 1990, 2004), Merrill (1984), Shiener & Weil (1992), Coile & Mulligan (2006) find home equity declines after bereavement, but do not consider mortgage debt holdings.

May engage in equity withdrawal, especially if not bequest motive.

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Debt Supply

- Incentive to default (finitely repeated game)
- Administrative data suggests probability of defaulting is lower for older debt applicants (Crook et al 1992, Bellotti & Crook 2009)
- Lenders aware of lower expected income of elderly so constraint debt supply
- Lenders often aware of net worth of applicants – may encourage supply to elderly

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Data

Wave	Survey Year	Survey	Cohort	Survey	Cohort	Survey	Cohort	Survey	Cohort	Survey	Cohort
1	1992	HRS	1931-41								
	1993			AHEAD	≤ 1923						
2	1994	HRS									
	1995			AHEAD							
3	1996	HRS									
	1997										
4	1998	HRS				CODA	1923-31	WB	1942-47		
	1999										
5	2000	HRS				CODA		WB			
	2001										
6	2002	HRS				CODA		WB			
	2003										
7	2004	HRS				CODA		WB		EBB	1948-53
	2005										
8	2006	HRS				CODA		WB		EBB	

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Empirical Models

Incidence of holding: random effects probit

$$p^{*}_{jit} = \alpha + \beta_1^T age_{it} + \beta_2^T health_{it} + \beta_3^T housevalue_{it} + \beta_4^T X_{it} + \delta_t + \upsilon_i + \varepsilon_{it}$$

$$p^{*}_{jit} > 0 \Rightarrow p_{jit} = 1$$
$$p^{*}_{jit} < 0 \Rightarrow p_{jit} = 0$$

$$p_{jit} = \Phi\left(\alpha + \beta_1^T age_{it} + \beta_2^T health_{it} + \beta_3^T housevalue_{it} + \beta_4^T X_{it} + \delta_t + \upsilon_i\right)$$

$$\varepsilon_{it} \sim NID\left(0, 1-\sigma_\upsilon^2\right);\upsilon_i \sim NID\left(0,\sigma_\upsilon^2\right)$$

Volume: random effects Tobit

$$debt_{jit} = \alpha + \beta_1^T age_{it} + \beta_2^T health_{it} + \beta_3^T housevalue_{it} + \beta_4^T X_{it} + \delta_t + \upsilon_i + \varepsilon_{it}$$

$$\varepsilon_{it} \sim NID\left(0, \sigma_\varepsilon^2\right);\upsilon_i \sim NID\left(0,\sigma_\upsilon^2\right)$$

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Variable Definitions

‘$Acute_{it}$’	either head or spouse, *i,* reports in period *t* that has ever been told the suffer from cancer, have had a heart attack or heart disease or a stroke.
‘$Chronic_{it}$’	either head or spouse, *i,* is reported in period *t* to have ever suffered from high blood pressure or hypertension or chronic lung disease (except asthma).
Insurance	posses any type of health insurance

Controls

household income, employment status, years of education, gender, whether white, marital status, wave specific dummies

Income in interval linear slope splines

1992 prices

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Percentage Holding of Debt by Age and Health Shock 2006

Total Debt

Age Range	With Acute Health Shock	Without Acute Health Shock	Total
Under 50	73.42	70.65	73.10
50-54	74.46	83.12	75.37
55-59	72.84	79.48	73.88
60-64	64.09	70.01	63.27
65-69	57.81	61.79	56.30
70-74	43.76	48.28	43.39
75-79	34.62	40.11	33.95
80-84	23.82	25.27	22.67
85 and over	13.25	18.13	12.82

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Percentage Holding of Debt by Age and Health Shock 2006

	Mortgage Debt			Consumer Debt		
Age Range	With Acute Shock	Without Acute Shock	Total	With Acute Shock	Without Acute Shock	Total
Under 50	60.63	58.92	61.46	49.89	40.23	42.51
50 – 54	56.04	72.42	58.87	48.30	46.04	46.10
55 – 59	52.34	69.71	56.51	46.95	45.76	46.41
60 – 64	52.52	57.79	47.29	37.52	34.08	35.65
65 – 69	43.21	49.03	41.18	31.37	30.52	30.50
70 – 74	27.84	36.72	28.02	25.04	22.09	24.41
75 – 79	18.65	29.30	19.11	21.58	19.86	21.21
80 – 84	13.14	16.57	12.67	14.40	11.18	13.49
85 and over	6.08	18.13	6.17	8.01	100.00	7.52

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Mean Holding of Debt by Age and Health Shock 2006

Total Debt

	Unconditional on holding debt			Conditional on holding debt		
Age Range	With Acute Shock	Without Acute Shock	Total	With Acute Shock	Without Acute Shock	Total
Under 50	59,200	83,797	73,275	80,630	118,605	100,244
50 – 54	54,618	80,424	62,286	73,354	96,756	82,642
55 – 59	64,009	69,595	58,383	87,872	87,563	79,027
60 – 64	43,037	47,781	39,856	67,150	68,244	62,998
65 – 69	36,674	41,227	32,740	63,438	66,721	58,148
70 – 74	18,466	33,099	18,970	42,195	68,562	43,719
75 – 79	12,339	26,726	13,204	35,638	66,630	38,892
80 – 84	7,053	11,685	6,752	29,606	46,234	29,784
85 and over	2,197	30,414	3,007	16,584	na	23,461

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Mean Holding of Debt by Age and Health Shock 2006

Mortgage Debt

	Unconditional on holding debt			Conditional on holding debt		
Age Range	With Acute Shock	Without Acute Shock	Total	With Acute Shock	Without Acute Shock	Total
Under 50	53,952	80,820	69,518	88,991	137,170	113,108
50 – 54	49,973	75,133	57,561	89,176	103,745	97,775
55 – 59	58,690	64,991	52,227	112,131	93,230	92,424
60 – 64	34,253	45,115	34,891	72,225	78,066	73,777
65 – 69	34,565	38,967	30,857	79,994	79,478	74,934
70 – 74	17,032	31,013	17,570	61,176	84,459	62,715
75 – 79	10,611	22,342	11,524	56,894	76,252	60,315
80 – 84	6,469	10,922	6,235	49,231	na	49,226
85 and over	2,006	30,414	2,795	3,3001	na	45,236

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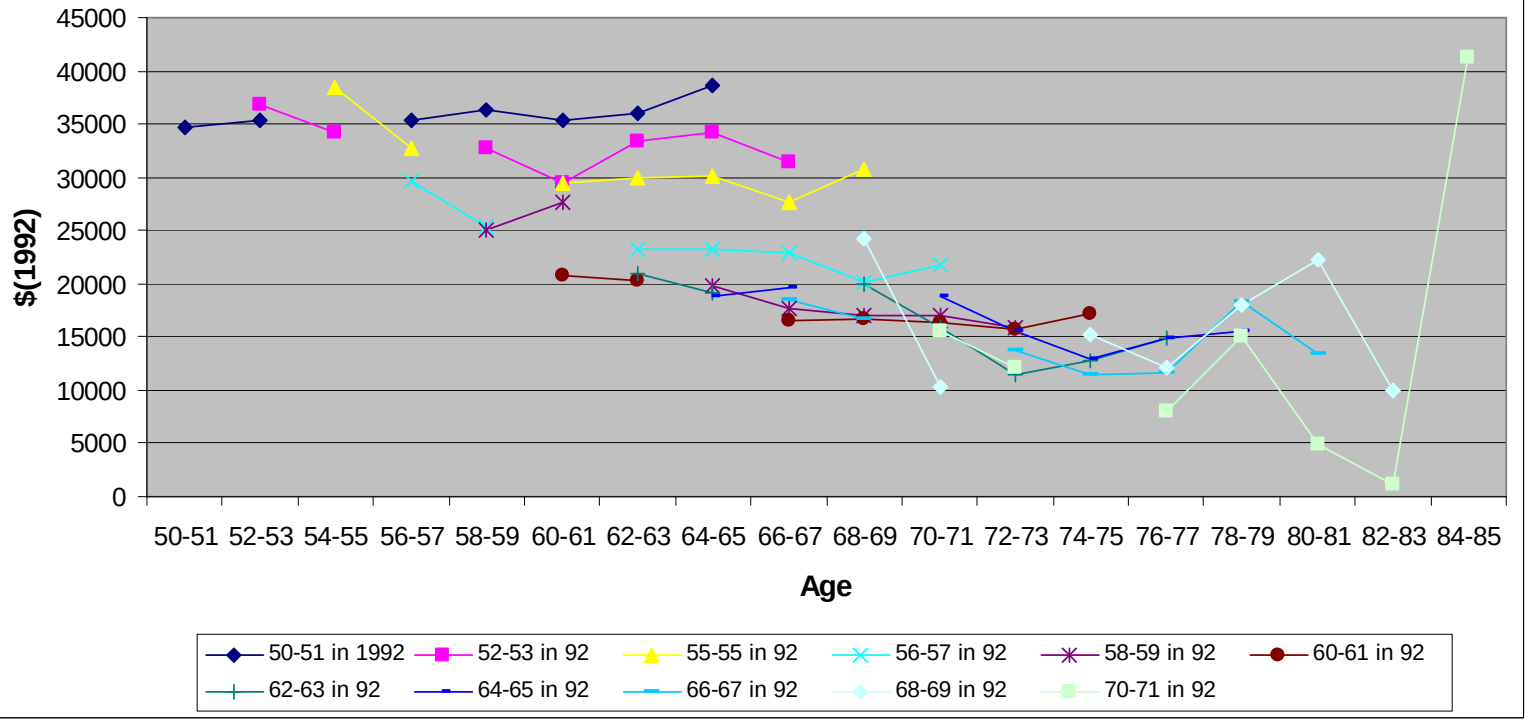
Mean Holding of Debt by Age and Health Shock 2006

Consumer Debt

	Unconditional on holding debt			Conditional on holding debt		
Age Range	With Acute Shock	Without Acute Shock	Total	With Acute Shock	Without Acute Shock	Total
Under 50	5,248	2,977	3,757	10,520	7,401	8,837
50 – 54	4,645	5,291	4,724	9,617	11,492	10,249
55 – 59	5,318	4,604	6,156	11,327	10,061	13,264
60 – 64	8,785	2,666	4,965	23,415	7,822	13,928
65 – 69	2,109	2,260	1,884	6,721	7,406	6,176
70 – 74	1,434	2,086	1,400	5,727	9,443	5,736
75 – 79	1,729	4,385	1,680	7,945	22,073	7,923
80 – 84	583	763	517	4,052	na	3,832
85 and over	190	0	212	2,377	na	2,815

Figure 1
Mean Value Total Debt Holdings by Cohort



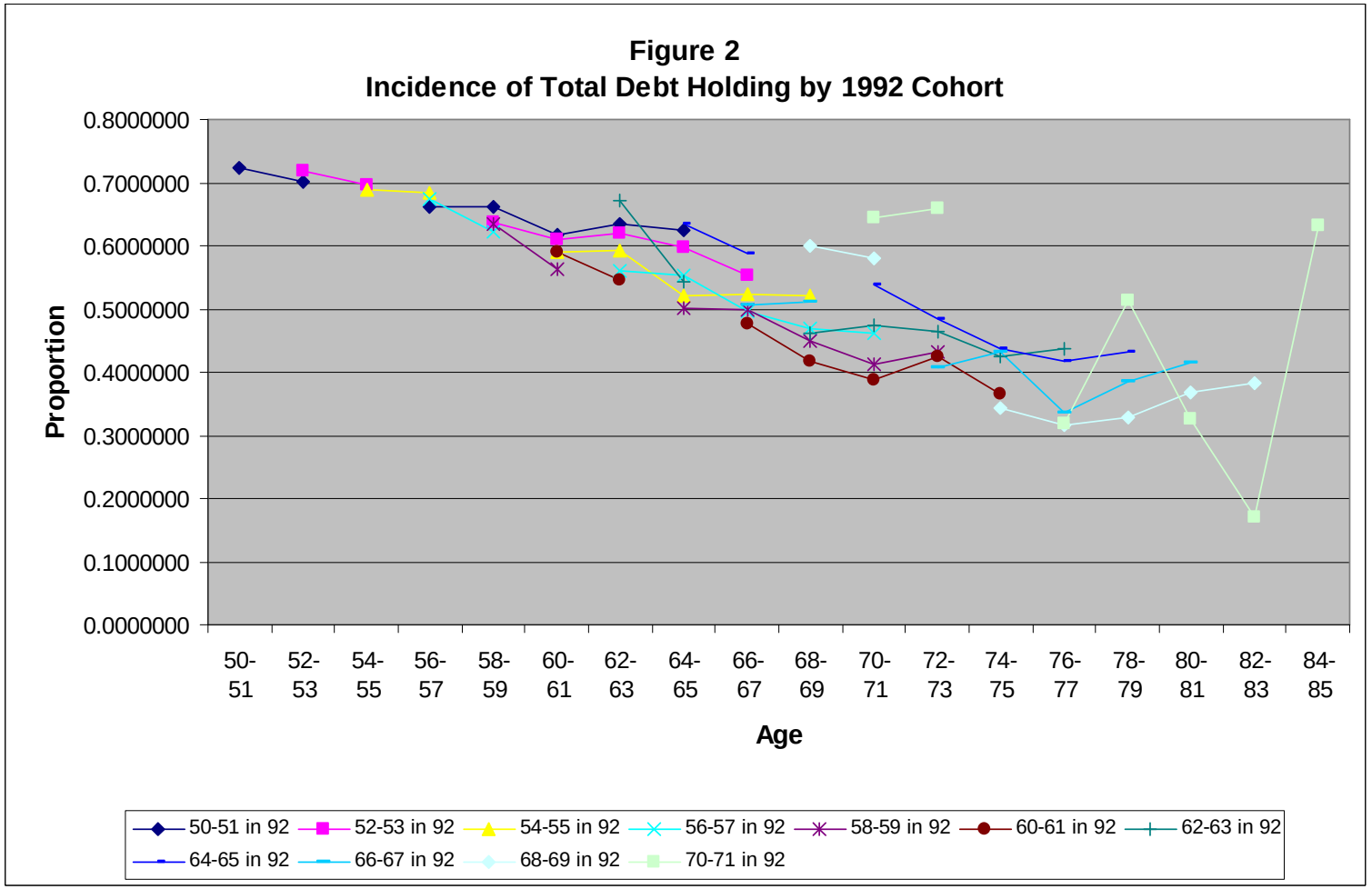


Figure 2
Incidence of Total Debt Holding by 1992 Cohort
Proportion
0.8000000
0.7000000
0.6000000
0.5000000
0.4000000
0.3000000
0.2000000
0.1000000
0.0000000
50-51
52-53
54-55
56-57
58-59
60-61
62-63
64-65
66-67
68-69
70-71
72-73
74-75
76-77
78-79
80-81
82-83
84-85
Age
50-51 in 92
52-53 in 92
54-55 in 92
56-57 in 92
58-59 in 92
60-61 in 92
62-63 in 92
64-65 in 92
66-67 in 92
68-69 in 92
70-71 in 92

Effects of Health Shocks

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Random Effects Tobit Parameter Estimates

	Ln (Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Age <50	0.060	0.157***	-0.085
Age 50-59	-0.153***	-0.138***	-0.156***
Age 60-69	-0.259***	-0.260***	-0.218***
Age 70-79	-0.390***	-0.400***	-0.317***
Age 80 plus	-0.383***	-0.392***	-0.466***
ln(income1)	0.125**	-0.053	0.238***
ln(income2)	2.159***	3.900***	2.302***
ln(income3)	0.348	0.771	0.015
ln(income4)	0.475	1.428***	-0.710
ln(income5)	1.193***	1.562***	0.347
ln(income6)	0.006	0.162	-0.870***
Acute health shock	0.781***	0.677**	1.360***
Chronic health shock	0.281	0.040	0.763**
Health insurance	0.272	0.227	0.211
Acute*has insurance	-0.541**	-0.757**	-0.702*
Chronic*has insurance	-0.433*	-0.279	-0.170
Value of homes (10+06)	1.05***	1.65***	-2.48***
Widow	-0.651***	-0.982***	-0.741**
Rho	0.58	0.64	0.266

* 10%; ** 5%; *** 1%.

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Probability of Holding Debt: Marginal Effects

	Ln(Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Age <50	0.008	0.017***	-0.005
Age 50-59	-0.020***	-0.018***	-0.009***
Age 60-69	-0.026***	-0.026***	-0.011***
Age 70-79	-0.036***	-0.036***	-0.015***
Age 80 plus	-0.036***	-0.032***	-0.022***
ln(income1)	0.019***	0.002	0.011**
ln(income2)	0.186***	0.272***	0.097***
ln(income3)	0.031	0.057	0.007
ln(income4)	0.030	0.084**	-0.037
ln(income5)	0.148***	0.154***	0.023
ln(income6)	-0.020	0.011	-0.051***
Acute health shock	0.093***	0.062**	0.058***
Chronic health shock	0.061**	0.007	0.046***
Health insurance	0.055**	0.031	0.019
Acute*has insurance	-0.064*	-0.068**	-0.026
Chronic*has insurance	-0.073**	-0.033	-0.018
Value of homes (10+07)	1.45*	2.43***	-1.17***
Widow	-0.046*	-0.068**	-0.040**
Rho	0.67	0.77	0.47

* 10%; ** 5%; *** 1%

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Value of Debt Conditional on Holding Respective Debt: Marginal Effects

	Ln(Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Age <50	0.026**	-0.006	0.004
Age 50-59	-0.035***	-0.025***	-0.023***
Age 60-69	-0.045***	-0.029***	-0.024***
Age 70-79	-0.051***	-0.016***	-0.043***
Age 80 plus	0.020	0.015	0.022
ln(income1)	-0.053***	-0.042***	-0.000
ln(income2)	0.410***	0.070	0.198
ln(income3)	0.345***	0.226**	0.209
ln(income4)	0.329***	0.109	0.067
ln(income5)	0.367***	0.242***	0.072
ln(income6)	0.231***	0.218***	0.213***
Acute health shock	0.083	-0.036	0.269***
Chronic health shock	-0.063	-0.112**	-0.017
Health insurance	-0.004	-0.052	-0.034
Acute*has insurance	-0.095	-0.019	-0.148*
Chronic*has insurance	0.012	0.056	-0.021
Value of homes (10+07)	4.24***	2.77***	3.50***
Widow	-0.229***	0.006	-0.032
Rho	0.60	0.59	0.43

* 10%; ** 5%; *** 1% GLS random effects regression

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Marginal Effects for Net Worth Quartiles (Conditional on Holding Respective Debt)

		Ln(Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Quartile 1	Acute health shock	0.087	-0.190***	0.314***
	Chronic health shock	0.001	-0.074	0.113
	Health insurance	0.247	-0.001	0.260
	Acute*has insurance	0.367	0.187	0.220
	Chronic*has insurance	-0.050	-0.042	0.159
Quartile 2	Acute health shock	0.098**	-0.022	0.116*
	Chronic health shock	-0.068	-0.064	-0.049
	Health insurance	0.048	0.029	-0.077
	Acute*has insurance	0.052	-0.027	0.225
	Chronic*has insurance	0.100	0.035	0.057
Quartile 3	Acute health shock	0.003	0.036	0.041
	Chronic health shock	-0.076*	-0.083**	-0.071
	Health insurance	-0.131	-0.217***	-0.165
	Acute*has insurance	0.009	-0.076	0.035
	Chronic*has insurance	-0.046	-0.185**	-0.051
Quartile 4	Acute health shock	-0.030	-0.067	0.102*
	Chronic health shock	-0.008	-0.028	-0.112*
	Health insurance	-0.037	-0.005	0.133
	Acute*has insurance	0.073	0.031	0.125
	Chronic*has insurance	-0.028	-0.016	-0.092

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Marginal Effects for Net Worth Quartiles (Conditional on Holding Respective Debt)

		Ln(Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Below Median	Acute health shock	0.105**	-0.054	0.202***
	Chronic health shock	-0.042	-0.076*	0.031
	Health insurance	0.093	0.034	0.023
	Acute*has insurance	0.163	0.025	0.186
	Chronic*has insurance	0.037	0.015	0.089
Above Median	Acute health shock	-0.022	-0.038	0.082**
	Chronic health shock	-0.035	-0.056**	-0.096**
	Health insurance	-0.092	-0.084*	-0.131
	Acute*has insurance	0.041	0.020	0.076
	Chronic*has insurance	-0.101	-0.118**	-0.068

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First difference specification

$$\Delta ldebt_{jit} = \alpha + \beta_1^T \Delta age_{it} + \beta_2^T \Delta health_{it} + \beta_3^T \Delta housevalue_{it} + \beta_4^T \Delta X_{it} + \beta_5^T \Delta Z_{it} + \delta_t + \upsilon_i + \varepsilon_{it}$$

Δ denotes first difference operator

X_{it} = (never married divorced widowed retired works unemployed)^T

Z_{it} = (gender race)^T

Δ'ever had' health condition = 1 only in period condition was first recorded

Estimated for

- Unconditional sample
- Sample conditional on no debt in previous period

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First Difference Marginal Effects

Type	Conditional on	Acute HS	Chronic	Acute & Ins	Chronic & Ins	N	rho
Mortgage	Having no mortgage debt in t-1	1.430***	-0.423	-1.53***	0.419	12018	0.690
Consumer	Having no consumer debt in t-1	-0.258	0.774**	0.365	-0.598*	14628	0.550

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Conclusions on effects of health shocks

Asymmetric relationship between health shocks and amount of debt owed.

- If household already has mortgage debt: health shock will not increase amount of mortgage debt owed
- If household already has consumer debt, having an acute shock will not immediately increase consumer debt, but will over time.

- If household does ***not*** owe mortgage debt and member suffers an acute shock, average household will
  - take out a mortgage if has no insurance
  - **not** take out a mortgage **if has insurance**

- If household has ***no*** consumer debt and suffers chronic shock they will incur new consumer debt and even if have insurance this will not quite cover the health costs incurred.

Effects of Changes in House Value

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Random Effects Tobit Parameter Estimates

	Ln (Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Age <50	0.060	0.157***	-0.085
Age 50-59	-0.153***	-0.138***	-0.156***
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Change in Value of homes: First Difference Marginal Effects

Type	Conditional on	Change in value of homes	N	rho
Mortgage	Having mortgage in t-1 and owning home in t-1	2.23*10-07***	8556	0.38
Consumer	Having consumer debt in t-1 and owning home in t-1	-4.14*10-07	5161	0.07

Debt Holdings and Widowhood

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Age 70-79	-0.390***	-0.400***	-0.317***
Age 80 plus	-0.383***	-0.392***	-0.466***
ln(income1)	0.125**	-0.053	0.238***
ln(income2)	2.159***	3.900***	2.302***
ln(income3)	0.348	0.771	0.015
ln(income4)	0.475	1.428***	-0.710
ln(income5)	1.193***	1.562***	0.347
ln(income6)	0.006	0.162	-0.870***
Acute health shock	0.781***	0.677**	1.360***
Chronic health shock	0.281	0.040	0.763**
Health insurance	0.272	0.227	0.211
Acute*has insurance	-0.541**	-0.757**	-0.702*
Chronic*has insurance	-0.433*	-0.279	-0.170
Value of homes (10+06)	1.05***	1.65***	-2.48***
Widow	-0.651***	-0.982***	-0.741**
Rho	0.58	0.64	0.266

* 10%; ** 5%; *** 1%.

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Probability of Holding Debt: Marginal Effects

	Ln(Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Age <50	0.008	0.017***	-0.005
Age 50-59	-0.020***	-0.018***	-0.009***
Age 60-69	-0.026***	-0.026***	-0.011***
Age 70-79	-0.036***	-0.036***	-0.015***
Age 80 plus	-0.036***	-0.032***	-0.022***
ln(income1)	0.019***	0.002	0.011**
ln(income2)	0.186***	0.272***	0.097***
ln(income3)	0.031	0.057	0.007
ln(income4)	0.030	0.084**	-0.037
ln(income5)	0.148***	0.154***	0.023
ln(income6)	-0.020	0.011	-0.051***
Acute health shock	0.093***	0.062**	0.058***
Chronic health shock	0.061**	0.007	0.046***
Health insurance	0.055**	0.031	0.019
Acute*has insurance	-0.064*	-0.068**	-0.026
Chronic*has insurance	-0.073**	-0.033	-0.018
Value of homes (10+07)	1.45*	2.43***	-1.17***
Widow	-0.046*	-0.068**	-0.040**
Rho	0.67***	0.77	0.47

* 10%; ** 5%; *** 1%

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Value of Debt Conditional on Holding Respective Debt: Marginal Effects

	Ln(Total debt)	Ln(Mortgage debt)	Ln(Consumer debt)
Age <50	0.026**	-0.006	0.004
Age 50-59	-0.035***	-0.025***	-0.023***
Age 60-69	-0.045***	-0.029***	-0.024***
Age 70-79	-0.051***	-0.016***	-0.043***
Age 80 plus	0.020	0.015	0.022
ln(income1)	-0.053***	-0.042***	-0.000
ln(income2)	0.410***	0.070	0.198
ln(income3)	0.345***	0.226**	0.209
ln(income4)	0.329***	0.109	0.067
ln(income5)	0.367***	0.242***	0.072
ln(income6)	0.231***	0.218***	0.213***
Acute health shock	0.083	-0.036	0.269***
Chronic health shock	-0.063	-0.112**	-0.017
Health insurance	-0.004	-0.052	-0.034
Acute*has insurance	-0.095	-0.019	-0.148*
Chronic*has insurance	0.012	0.056	-0.021
Value of homes (10+07)	4.24****	2.77***	3.50***
Widow	-0.229***	0.006	-0.032
Rho	0.60	0.59	0.43

* 10%; ** 5%; *** 1% GLS random effects regression

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Becoming Widowed: First Difference Marginal Effects

Type	Conditional on	Becoming widowed	N	rho
Mortgage	Having mortgage in t-1 and owning home in t-1 and not widowed in t-1	-1.895	8556	0.38

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Conclusions

- Consistent with PIH, debt holdings decrease with age amongst the elderly.
- Preferences, as indicated by demographics, still affect debt holdings and in same way as for those who are younger.
- If a household does not have a mortgage an acute health shock leads the household to take out a mortgage.
- If a household does not have consumer debt a chronic health shock would be associated with taking out a loan.
- On average, if household has health insurance this would cover the amounts of debt they would take out following a health shock.
- Those without insurance would take out additional debt, but only a small amount.
- Elderly households increase their mortgage if the value of their home increases.
- If one partner dies, and the household owned its own home with a mortgage, the surviving partner would reduce the value of the mortgage substantially within the following two years.